04 May 2000

COMMAND MANAGEMENT REVIEW (CMR)
FOR MATERIEL MAINTENANCE MANAGEMENT

1. Equipment Operational (Availability) Rate.

USACE has set operational criteria or a goal for all Command activities to strive for or surpass. Our goal is to achieve an equipment operational readiness rate that is 85 per cent or higher. Equipment readiness will be measured using colors to designate specific numeric ranges or degrees of equipment readiness. Green is 85 percent or higher, Amber is 75 to 84, and Red is 74 percent or lower.

DEFINITIONS:

a. **Equipment On-hand Quantity:** The total quantity for each reportable item shown in appendix A, that the property book reflects as on-hand in the activity, on the last day of the reporting period.

b. **Possible Days:** The total number of days the equipment was on hand during the reporting period (i.e., 1 item = 92 days, 2 items = 184 days in the Qtr). To determine possible days for equipment on hand received during the current quarter, count from the property book date of receipt to the end of the reporting period.

c. **Non available Days:** The number of days equipment was not able to perform its intended mission. When equipment items are not mission capable at the end of the normal workday, they are considered non-available the entire day. When equipment is repaired prior to the end of the normal workday, it will be considered available for the entire day.

d. **Available Days:** The total possible days minus the total non-available days. Equipment that remains operational during test, inspections, and preventive maintenance (PM) service, is counted as available.

e. **Operational Rate:** The percentage of available days based on the possible days. The formula to derive the mathematical expression for each equipment item considers the Total Available Days, divided by the Total Possible Days, which is then multiplied by 100. This number represents the operational rate, expressed as a percentage.

Example: To compute the Operational Rate: first divide available days by possible days. Then multiply the resulting decimal (fraction) by 100 to convert it to a percentage, i. e., when we have one equipment item with 82 available days, and 91 possible days, the equation would be:

$$\textbf{Formula: } \frac{\textbf{Available Days}}{\textbf{Possible Days}} \times 100 = \textbf{Operational Rate}$$

82/91 = .901 x 100 = 90.1 %. (Green)

2. Equipment Maintenance Cost (Parts & Labor.

USACE has set the following criteria for all command activities to strive for or surpass. The goal is to maintain our equipment in such a manner that it will achieve maximum longevity with minimum maintenance cost. Equipment maintenance cost will be measured using colors to designate specific numeric ranges or degrees of maintenance cost. Industry experience has shown that certain ratios and percentages of total equipment maintenance budget, versus expenditures by category, can send management clues on where MMMP performance can improve.

Maintenance Category	Green	Amber	Red
Preventive Maintenance (PM).	30 – 35 %	25 – 29 %	24 % or less
Predictive Maintenance (PdM)	10 - 15 %	5 – 9 %	4 % or less
Repair Maintenance (RM)	15 - 20 %	21- 25 %	26 % or more
Rebuild Maintenance (RbM)	15 - 20 %	21 – 25 %	26 % or more
Modification (MM)	5 - 10 %	11 – 15 %	16 % or more

DEFINITIONS:

a. **Repair Parts Cost:** Self-explanatory.

b. **Labor Cost:** The fully burden (hourly) labor rate of the craftsman performing the Maintenance task.

c. Maintenance Category Cost: The total maintenance cost both parts and labor for any one of the five maintenance categories.

d. **Total Equipment Maintenance Expenditures:** The total maintenance cost spent on both parts and labor for all five-maintenance categories.

e. **Total Equipment Maintenance Budget:** That portion of the total maintenance budget set aside for the maintenance of equipment.

Example: To determine the percent of total equipment maintenance budget spent on preventive maintenance, parts = $10,410, labor = $ 34,525, total parts and labor = $ 44,935, total equipment maintenance expenditures for all maintenance categories = $ 201,800.

$$\textbf{Formula: Preventive Maintenance} = \frac{\textbf{Preventive Maintenance Cost}}{\textbf{Total Equipment Maintenance Budget}} \textbf{ X 100}$$

$ 44,935/ $ 201,800 = .2227 X 100 = 22.27 (Red)

The above formula is used for all five-maintenance categories)

3. Equipment Maintenance Backlog.

USACE has established a goal of 15 percent or less for maintenance backlog. Maintenance backlog will be depicted using colors for specific numeric ranges or percent of maintenance backlog. Green = 15 percent or less, Amber = 16-20 percent, and Red = 21 percent or higher.

DEFINITIONS:

a. **Maintenance Hours Scheduled (Planned):** Maintenance hours required to perform the required maintenance task. Normally this will include the categories of preventive and predictive maintenance only. This type of maintenance and the associated hours required to perform can be planned in advance based on some type of schedule, example, Quarterly service, every three months, or two hundred and fifty hours which ever comes first

b. **Maintenance Hours Unscheduled (Added):** Maintenance hours required to perform the required maintenance task. Normally this will include the categories of repair, rebuild, and modification maintenance. This type of maintenance and the associated hours required are usually unexpected and, therefore, could not normally be planned in advance.

c. **Maintenance Hours Incomplete:** The maintenance hours that remain incomplete at the end of the quarter.

e. **Backlog:** Is the ratio of maintenance hours incomplete at the end of the quarter compared to total maintenance hours scheduled (planned) at the beginning of the quarter plus additional maintenance hours resulting from unscheduled maintenance during the quarter.

We can determine scheduled (planned) maintenance hours at the beginning of the quarter, by summation of maintenance hours required to complete all scheduled and predictive maintenance during the quarter, and adding additional maintenance hours resulting from unscheduled maintenance during the quarter.

Example:

	Maintenance Hours Scheduled	**Maintenance Hours Unscheduled**	**Maintenance Hours Incomplete**
Maintenance Category			
Preventive Maintenance (PM).	2050	0	300
Predictive Maintenance (PdM).	500	0	50
Repair Maintenance (RM).	0	400	40
Rebuild Maintenance (RbM).	0	500	8 0
Modification (MM)	0	150	0
Total	2550	1050	470

Formula: $\dfrac{\text{Maintenance Hours Incomplete}}{\text{Total Maintenance Hours (Scheduled + Unscheduled)}} \times 100 = \text{Backlog}$